CLAIMS

WE CLAIM AS OUR INVENTION:

1. A catalytic gas turbine comprising:

a compressor receiving an inlet air and producing compressed air;

a catalytic combustor receiving a combustion portion of the compressed air and producing a hot combustion gas;

a turbine receiving the combustion gas; and

a flow path conducting a bypass portion of the compressed air around the combustor and turbine.

2. The catalytic gas turbine of claim 1, further comprising a bypass metering valve, responsive to a bypass valve control signal, positioned in the flow path for controlling a flow of the bypass portion.

3. The catalytic gas turbine of claim 2, further comprising a controller for generating the bypass valve control signal responsive to at least one of the group consisting of an air-to-fuel ratio in the catalytic combustor, a temperature of a catalyst in the combustor, a temperature of the combustion gas, and the speed of rotation of the turbine.

4. The catalytic gas turbine of claim 1, wherein the compressor comprises stages numbering 1 through N consecutively from a lowest pressure stage to a highest pressure stage, the bypass portion extracted from a stage having a stage number greater than N/2.

5. The catalytic gas turbine of claim 1, further comprising a recirculation flow path receiving a recirculation portion of the compressed air and conducting the recirculation portion into the inlet air.

6. A catalytic gas turbine comprising:

a compressor receiving inlet air and producing compressed air;

a catalytic combustor receiving a combustion portion of the compressed air and producing a combustion gas;

a turbine receiving the combustion gas and producing an exhaust gas; and

a flow path receiving a recirculation portion of the compressed air and conducting the recirculation portion into the inlet air.

7. The catalytic gas turbine of claim 6, further comprising a recirculation metering valve, responsive to a recirculation valve control signal, positioned in the flow path for controlling a flow of the recirculation portion.

8. The catalytic gas turbine of claim 7, further comprising a controller for generating the recirculation valve control signal responsive to at least one of the group consisting of a temperature of the combustion gas, a temperature of the exhaust gas, a temperature of the inlet air, and a temperature of an ambient air.

9. The catalytic gas turbine of claim 7, wherein the compressor comprises stages numbering 1 through N consecutively from a lowest pressure stage to a highest pressure stage, the recirculation inlet disposed downstream of a stage having a stage number greater than N/2.

10. The catalytic gas turbine of claim 6, further comprising a bypass flow path conducting a bypass portion of the compressed air around the combustor and turbine.

11. A method of operating a catalytic gas turbine having a compressor, a catalytic combustor, and a turbine, the method comprising:

opening an inlet guide vane upstream of the compressor to a position allowing the compressor to compress a volume of air exceeding a volume of air needed to support combustion;

extracting a bypass portion of the compressed air produced but not needed to support combustion; and

directing the bypass portion of the compressed air around the combustor and turbine.

12. The method of claim 11, further comprising directing the bypass portion into a heat exchanger.

13. The method of claim 11, further comprising at least partially closing the vanes after activation of a catalyst to a position sufficient to reduce the temperature of the compressed air to maintain a desired catalyst operating temperature lower than a catalyst activation temperature.

14. The method of claim 11, further comprising:

extracting a recirculation portion of the compressed air; and

directing the recirculation portion into the inlet of the compressor.

15. The method of claim 14, further comprising controlling the recirculation portion responsive to one of the group consisting of a temperature of the compressed air, a temperature of the exhaust gas, a temperature of the inlet air, and a temperature of the ambient air.

16. The method of claim 11, wherein the compressor comprises stages numbering 1 through N consecutively from a lowest pressure stage to a highest pressure stage, the method further comprising extracting the bypass portion from a stage having a stage number greater than N/2.

17. The method of claim 14, wherein the compressor comprises stages numbering 1 through N consecutively from a lowest pressure stage to a highest pressure stage, the method further comprising extracting the recirculation portion from a stage having a stage number greater than N/2.